



## PRACTICAL WORK N°3

### Basic Commands and Utilities | Command's Documentation Managing Users, Groups, Sessions

#### ⌚ A Reminder !



##### ☒ Identifying Commands :

**type** — Display a Command's Type    **which** — Display an Executable's Location

##### ☒ Command's Documentation :

**help** — Get Help for Shell Built-in  
**--help** — Display Usage Information  
**man** — Display a Program's Manual Page  
**apropos** — Display Appropriate Commands

**whatis** — Display One-line Manual Page Descriptions  
**info** — Display a Program's Info Entry

*README and Other Program Documentation Files*

##### ☒ Basic Commands :

##### Connections, sessions, SSH :

Sessions	
<code>su</code>	Changer d'identifiant d'utilisateur ou devenir root
<code>exit (shell)</code>	Terminer le shell et la session courante
<code>sudo &lt;commande&gt;</code>	Exécuter une commande en tant qu'un autre utilisateur (root...)
Connexions à distance	
<code>slogin</code>	Connexion à distance - interactive
<code>ssh</code>	Exécution d'un shell à distance - non-interactif
<code>scp</code>	Copie de fichiers local <-> distant - non-interactif
<code>sftp</code>	Transfert de fichiers - interactif
Avancées	
<code>ssh-keygen</code>	Création d'une clé d'authentification
<code>ssh-agent</code>	Agent d'authentification - pour simplifier l'usage des clés
<code>ssh-add</code>	Enregistrement d'une clé privée dans un agent
<code>~/.ssh/ lftp</code>	Répertoire de configuration personnelle remplacement sophistiqué pour sftp (et autres protocoles)

##### Users & Groups Management :

Création et suppression	
<code>useradd, userdel</code>	ajouter/supprimer un utilisateur
<code>adduser, deluser</code>	(Debian) ajouter/supprimer un utilisateur ; plus complet
<code>passwd</code>	définir le mot de passe d'un utilisateur
<code>/etc/ passwd, group</code>	comptes utilisateurs, groupes Unix
<code>/etc/ shadow, gshadow</code>	mots de passe cachés des utilisateurs, des groupes
<code>/etc/adduser.conf</code>	(Debian) valeurs par défaut pour les commandes adduser et addgroup
<code>/etc/skel</code>	le squelette des fichiers personnels de chaque utilisateur
<code>usermod</code>	modifier un compte utilisateur
<code>chage</code>	changer les paramètres d'expiration d'un mot de passe
<code>pwgen</code>	générer des mots de passe aléatoires
<code>mkpasswd</code>	générer un mot de passe crypté
NSS et PAM	
<code>getent</code>	lister les entrées des bases de données NSS
<code>/etc/pam.d/*</code>	règles d'authentification des modules PAM disponibles
<code>/etc/security/*</code>	configuration des options des modules PAM
<code>/etc/nsswitch.conf</code>	fichier de configuration des bases de noms système
Surveillance des connexions	
<code>who</code>	montrer qui est connecté
<code>w</code>	afficher la liste des utilisateurs connectés et des terminaux
<code>last (b)</code>	afficher la liste des derniers utilisateurs connectés
<code>lastlog</code>	afficher la plus récente connexion de chaque utilisateur
Sudo	
<code>sudo</code>	lancer une commande en tant qu'administrateur
<code>sudoedit</code>	modifier un fichier en tant qu'administrateur
<code>vipw, vigr, visudo</code>	modifier les fichiers critiques avec une sécurité renforcée
<code>/etc/sudoers</code>	utilisateurs bénéficiaires de la commande sudo

**☒ Text editors and utilities :**

<b>Indispensables</b>	
vim	Éditeur canonique sous Unix, riche et puissant, successeur de vi
<b>Utiles</b>	
vimtutor	Tutoriel vim - session de vim sur un fichier-exercice
nano	Éditeur de texte minimalist
joe	Éditeur de texte simple
emacs	Éditeur à tout faire, rival de vim. Mode X (par défaut) conseillé.
diff	Comparer des fichiers ligne à ligne, ou des répertoires récursivement
patch	Appliquer des modifications (fichier diff) à un fichier source

**⌚ Notes & Practical Tips**



- ☒ Connection :** To work on a **Linux** distribution, you need to have an account, so enter your username (login) and password.
  - **Username:** 1BTgXbY (**X** is your **Group** number and **Y** is your **Machine** number)
  - **Password:** NSCS-sZ (**Z** is your section number)
- ☒ Attention :**  
**UNIX/Linux** differentiates between uppercase and lowercase. Most commands should be written in lowercase. Always separate the command from its arguments with spaces.

**⌚ Objectives**

- Discover the **terminal** and the command line (**Shell**) with Basic commands & Linux environment Utilities
- Identifying Commands : Type & Location
- Getting a Command's Documentation using various built-in tools.
- Managing Users, Groups, Sessions & Permissions

**PART 1: THEORETICAL PART / COURSE QUESTIONS***Course Questions*

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**PART 2: ACTIVITIES****⌚ ACTIVITY 1: System Information**

- What system is installed?
- What distribution is installed?
- Who are the current system users?
- Open a new terminal using another account.
- Close this terminal.

**⌚ ACTIVITY 2: Gathering System Information Using the Linux Shell**

**Objective:** Use various shell commands to gather and display various pieces of information about your system, such as hardware and software details, system performance, disk usage, memory, and more.

**Tasks:****1. Basic System Information**

- Find the **hostname** of the system.
- Determine the **Linux kernel version** you are running.
- Display the **current logged-in users**.

**2. Hardware Information**

- Find out the **CPU model** and number of cores.
- Check the **total RAM** available on your system.
- Get the **disk space usage** for all mounted filesystems.
- Display the **PCI devices** connected to your system.

**3. System Uptime and Load**

- Find out the **system uptime** (how long the system has been running).
- Display the **system load averages** (1, 5, and 15 minutes).

**4. Network Information**

- Display the **IP address** assigned to your system.
- List all active **network interfaces** on the system.
- Show the **current network connections**.

**5. File System Information**

- Display detailed information about the **file system type** and **mounted file systems**.
- Show the **total disk space** and **available space** on the root partition.

**6. Process and Resource Usage**

- Show a list of the **top 5 processes** consuming the most CPU.
- Display the **top 5 processes** consuming the most memory.
- Display the **system's current memory usage** (used, free, and available).

**Conclusion :** This exercise provides you with a solid understanding of how to gather key system information using the Linux shell. You'll be able to use these commands to monitor the status and health of your system, **troubleshoot performance issues**, or simply learn more about your system's hardware and software configuration.

### ⌚ ACTIVITY 3 : Getting a Command's Documentation : ***man , info , help***

Use the commands (**man** ; **info** ; **--help**) to obtain documentation for the set of commands used to gather information about your system (**used in the previous activity**).

Examine the differences in the information you get from each method : (**man** ; **info** ; **--help**).

#### Expected Results:

- **man ls** : You should see a full manual page with sections like *NAME*, *SYNOPSIS*, *DESCRIPTION*, *OPTIONS*, and *EXAMPLES*.
- **info ls** : The output will be a structured document with a table of contents and often more detailed explanations of options. You can navigate through the document to read about different topics.
- **ls --help** : This will give you a quick summary of command options, typically in a single screen's worth of text.

### ⌚ ACTIVITY 4 : Getting a Command's Documentation using ***man***

#### A. What commands are likely to be documented in **man pages** ?

The **man** (manual) **pages** cover a wide range of commands and tools. Here are the main types of commands that are typically documented in **man** :

1. **Shell Commands (Unix/Linux utilities):** `ls` , `cp` , `mv` , `rm` , `grep` , `find` , `cat` , `echo` , `pwd` , `chmod` , `chown` , ...
2. **System Calls and Library Functions:** `open()` , `read()` , `fork()` , `pthread_create()` , ...
3. **System Administration Commands:** `ps` , `top` , `systemctl` , `service` , `df` , `du` , `netstat` , ...
4. **Configuration Files:**
  - `/etc/passwd` (user account information)
  - `/etc/fstab` (list of file systems to be mounted)
  - `/etc/hostname` (system hostname)
5. **Linux Distribution-Specific Programs:** `apt` (package management for Debian/Ubuntu), ...
6. **Network Management Commands:** `ping` , `ifconfig` , `ip` , `traceroute` , ...
7. **Compression and Archiving Commands:** `tar` , `gzip` , `bzip2` , `zip` , `unzip` , ...
8. **User and Group Management Commands:** `useradd` , `usermod` , `groupadd` (add a new group), `passwd` , ...
9. **Memory and Resource Management Commands:** `free` , `vmstat` , `ulimit` , ...
10. **Security and Access Control Commands:** `chmod` , `chown` , `sudo` , `passwd` , ...
11. **Process Management Commands:** `kill` , `killall` , `bg` , `fg` , ...

#### B. How to find the documentation for a command in **man** ?

- **Basic Command:** To get the manual for a command, simply type `man` followed by the command name.  
For example: **man ls**

- **Man Page Sections :** You can specify a section of the man pages if you need documentation from a specific section.  
For example :
  - **man 1 ls** : documentation for the user command `ls`
  - **man 2 open** : documentation for the system call `open()`
  - **man 5 passwd** : documentation for the `passwd` configuration file

#### C. Test the **man** command to get documentation on some commands (**used in the previous activity**).

### **ACTIVITY 5 : Users & Groups Informations**

1. List the contents of the directory **/etc**.
2. List in detail the contents of the directory **/etc**  
Are the files named "**passwd**", "**shadow**", "**group**" and "**gpasswd**" present in **/etc** ?
3. List the contents of the directory **/dev**
4. List the contents of the file **/etc/passwd**.
5. List the contents of the file **/etc/shadow**.
6. Display in alphabetical order the users defined in the file **/etc/passwd**

### **ACTIVITY 6 : Setting up a Workspace for 4 Users**

1. Define the batch of commands to be executed to create **4 users** using the following rules:
  - Creation of **2 groups**.
  - The first and second users are members of the first group.
  - The third and fourth users are members of the second group.
  - The second user is also a member of the second group.
  - The fourth user is also a member of the first group.
  - In addition to their work directory, users have access to a common directory **/home/group1** and/or **/home/group2** depending on their group.
2. In this directory, they can write and create files but cannot delete files.
  - a) Describe the steps involved in creating groups, users and directories, including which files and commands you use.
  - b) Modify the user profiles so that when they log in, they are asked which home directory they want to work in (if they enter **U**, it will be under their directory, if they enter **G**, it will be under their group's directory).
  - c) Of these three values: Which **umask** for 066, 067, 077 ?  
For each value, explain the consequences of this choice.

### **ACTIVITY 7 : User Management**

1. Is your user account defined in the file **/etc/passwd** ? Why ? Are there other alternatives?
2. What is the root user's login directory?
3. What is the root user's shell?
4. What is special about the nobody user? And the user shutdown ?
5. Which users defined in **/etc/passwd** are part of the same group as the administrator ?

### **ACTIVITY 8 : Session Management**

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